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Apple Tree Anthracnose

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APPLE TREE ANTHRACNOSE

Gloeosporium malicorticis.

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The Apple Tree Anthracnose, as it is best known in Oregon, is a disease of the apple tree which is peculiar to the Pacific Northwest. It occurs in no other part of the United States as a serious disease. Its distribution is as follows: It extends from British Columbia to the southern part of Oregon and possibly into California. It occurs also in Idaho. It is not known how far east the disease extends, though it has been reported once as far east as Nebraska.

In Oregon it is, with the possible exception of the Apple Scab, the most serious fungous disease with which the apple grower has to deal. The disease is characterized by the appearance of dark colored sunken cankers, which are found most abundantly on the younger branches.

DESCRIPTION OF CANKERS: The cankers are first to be observed in the winter as round dark colored spots which slowly enlarge and elongate, making little visible growth during the dormant season, but, on the advent of spring and the consequent renewed activity in the life processes of the tree, continue to grow rapidly. The cankers are deeply sunken, dark in color, with a limiting crack around the edge. Sometimes the cankers are so large that they girdle branches to such an extent that the entire tops may be killed. In some cases young trees are killed by cankers forming on the trunk. These are perhaps extreme cases, but by no means uncommon. As usually seen the disease is found to produce few or many cankers on the younger branches of trees, occasionally girdling a twig or branch.

The bark in mature cankers is found to be dead to the wood. After the active spread ceases, the bark may cling in the cankers for one or more seasons, finally falling away leaving an ugly scar which heals slowly. When a number of cankers occur on the branches, the proper distribution of the elaborated food is interfered with and the tree suffers.

CAUSE OF THE DISEASE: The cankers are caused by a parasitic fungus known technically as Gloeosporium malicorticis Cordley. The fungus starts growth in the tissues in the fall or early winter, the mycelium develops in the tissues of the bark slowly, breaking them down and causing the canker.

DESCRIPTION AND LIFE HISTORY OF FUNGUS: If a mature canker is examined in midsummer, little elevations in the bark are easily observed. They are at first more or less conical in shape and are thickly scattered in the sunken area. They gradually enlarge and finally burst the outer layer of the bark and expose the cream colored mass of fungous tissue. These are the ascervuli or fruiting bodies and bear the reproductive cells of the fungus, which are very minute, curved, colorless bodies, called spores. These are invisible to the naked eye except in mass, and are produced in countless thousands in the pustules already described. They are held together during the dry weather by a sticky substance, and are only liberated by the first fall rains, when they are broadly distributed by wind and rain, often being carried for long distances. Moisture is necessary for the growth of these spores, which under proper conditions grow out into a slender

tube which may penetrate the bark of the apple, ramify in the tissues, and kill them, producing the typical cankers.

It is possible to isolate the organism causing this disease and to grow it in pure culture. By taking a portion of such a culture and inserting it in the bark of a healthy tree, the typical cankers of the disease are produced. This proves beyond a doubt that the cankers are caused by the fungus.

TIME OF INFECTION: Infection takes place in the fall at any time after the first fall rains. The great majority of the infection doubtless occurs from about the middle of October to the first of December. After infection the fungus spreads slowly in the fall, remaining practically dormant during the winter and begins active growth again in the spring. The spread of the fungus in the tissues ceases early in the summer and when the canker is mature can be found only in the sunken bark.

AGE OF CANKERS: There is no evidence to show that the cankers grow in size after midsummer. It is true that the mycelium or vegetative stage of the fungus remains alive in the bark of old cankers at least till the second autumn after the infection, and spores like those produced in the cankers the first year after infection are found in limited quantity. The second year's growth, however, is as a saprophyte on the dead bark which still clings to such cankers. The presence of another spore stage, the sexual spore which is common in the life history of the fungi of this nature, has not been proven to be present in the life history of the apple tree anthracnose.

THE DISEASE ON THE FRUIT: Besides the cankers on the branches we sometimes find a disease of the fruit caused by the same fungus. On the fruit the spots first appear as small, brown, sunken areas which gradually enlarge, producing a rather soft rot. Finally pustules are produced which bear spores like those found in the cankers on the branches. Apple tree anthracnose, however, is not to be considered a serious trouble of the fruit. The spots occur only when the fruit has been left hanging on the trees for some time after the fall rains begin. In seasons when the rains begin early it will be more prevalent than when they occur later.

TREATMENT, GENERAL: In treating a fungous disease of this nature it is important that the tree be covered with some fungicidal substance that will prevent the germination of the spores and so keep the fungus from entering the tissues. After the fungus once enters the bark no spray can be applied that will kill the fungus and not kill the tissues as well. The treatment must be preventative and not curative.

It has formerly been recommended to spray with Bordeaux mixture or lime-sulphur as soon as the fruit is picked. It has frequently happened that large growers have not been able to spray owing to the fact that by the time the apples were picked the season was so far advanced that on account of the frequency of the rains no opportunity was offered. On this account an experiment was conducted in the Wallace orchard at Salem to test the effect on the fruit of several different strengths of lime-sulphur as well as the Bordeaux mixture and the ammoniacal solution of copper carbonate. The variety sprayed was the Spitzenberg, and it was found that the deposit made on the fruit by the application of spray during the last week in September did not injure the fruit in any way, or seriously interfere with the uniform coloring. Occasionally, however, where the Bordeaux mixture or

lime-sulphur collected in drops and made a thick deposit, the color did not develop uniformly, and caused a slightly mottled appearance when the fruit was wiped.

SPRAYING: When for the reasons given above it is considered desirable to spray before the fruit is picked, we feel safe in advising growers to use any of the above mentioned mixtures as late as possible before the first fall rains. The Bordeaux mixture 4-4-50 is to be preferred, since it has been shown to be the best fungicide for this disease. This spraying should be followed by another application as soon as possible after the fruit is picked, using winter strength Bordeaux mixture 6-6-50. In very seriously infested orchards a third application might prove beneficial and should be applied about two to three weeks after the second. Badly affected branches should be pruned out preceding the fall spraying.

The method outlined above is especially recommended for the purpose of cleaning up an orchard that has become badly infested. Under ordinary weather conditions when anthracnose is not abundant or when an orchard is sprayed merely for the purpose of preventing the disease from obtaining a foothold, the last two applications are usually sufficient. Good results have been obtained by the use of one annual application of Bordeaux mixture as soon as possible after the fruit is picked.

CUTTING OUT THE CANKERS: Where practical the cankers may be cut out before fully formed during the winter or early spring. To do this it is only necessary to shave off the outer bark. The tissues will then dry out, the trees throw off the disease and the production of spores will be prevented. This method is especially recommended for young orchards where all parts of the tree may be reached from the ground. It is also advisable where practical to cut out the dead bark of old cankers, making a clean wound. The exposed wood should be painted. Wooly aphis works under the bark of old cankers and prevents the normal formation of callus, which makes the above mentioned treatment especially desirable. Heart rot fungi may also gain entrance to the wood through the wounds caused by this disease if they are not properly cared for.

It is probable that the fungus is a native of the Northwest and grew on some native species of the apple family before the cultivated apple was introduced. This native host has never been discovered, or if so the fact has not been made public.

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